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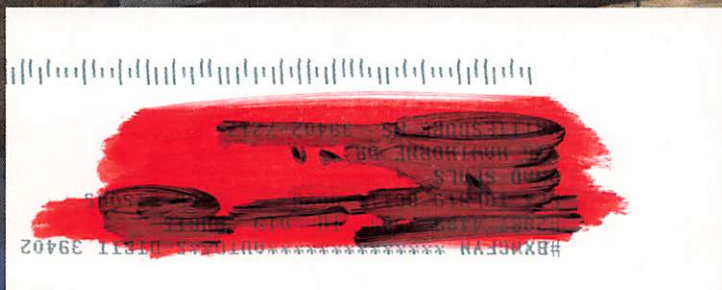
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SEPTEMBER 2014

THE AS&U 100

Schools in some former metropolises have faded remarkably in the last quarter century, while other districts flourish in unlikely places.

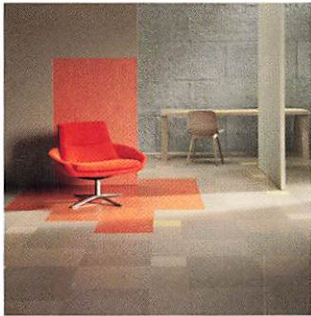


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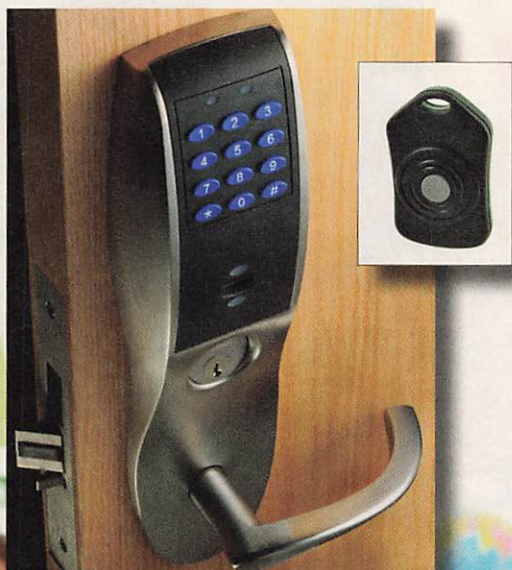
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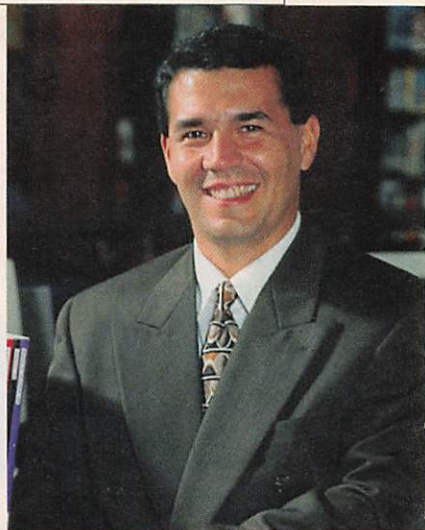
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Building it Right



JOE AGRON
JAGRON@ASUMAG.COM

Having just finished two days of judging education facilities projects for the upcoming Architectural Portfolio competition (published in November), this year's jury focused a lot of attention on innovation, quality and "building it right."

That's what makes recent news such as a Texas high school having to spend millions of dollars to repair a recently completed facility so disturbing.

Last month, it was reported that the Allen Independent School District may have to spend up to \$2 million to repair a two-year-old facility upon discovering "engineering failures" at its \$60 million high school stadium. Inadequate support columns, weak connections and insufficient steel reinforcement in a retaining wall were among the deficiencies cited. Earlier this year, an analysis of two schools

in Oklahoma destroyed by a tornado in the spring revealed significant construction errors and code violations.

This news follows a number of similar instances uncovered last year that cast a shadow over the education construction market, including neglected repairs and mistakes by contractors who renovated a Massachusetts high school that left district taxpayers saddled with approximately \$1 million in unfinished work. And a lawsuit filed by the Philadelphia school district that cited "deficiencies in the drawings and specifications" by nearly two dozen architecture and design firms resulting in millions of dollars in facilities problems at Philadelphia schools.

While disturbing, problems such as these are not representative of the billions of dollars in education construction put in place every year. The majority of school and university

construction projects completed today are expertly and carefully planned, designed and built. Administrators and architects work jointly to ensure the facilities they complete are welcome additions to the students, staff and community.

So when news of poorly built or designed school or university construction projects emerges, understand there are countless numbers of exceptional education facilities recently completed that are not making headlines. Buildings that are built right—providing outstanding learning environments and a community asset that will last long into the future. ■

Joe Agron

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• Every month in 2015, AS&U will send an e-mail to subscribers with the logo, project picture and marketing message from that month's sponsor. And more!

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WEB EXCLUSIVES:

Museum recognizes Ala., new high school for safe rooms



An exhibit at the National Building Museum in Washington, D.C. is highlighting the only state in the union – Alabama – that requires tornado safe rooms in new schools.

Designing for Disaster, which runs through Aug. 2, allows visitors to take a close look at how policies, plans and designs can help communities withstand

natural disasters. An Alabama school, Park Crossing High School in Montgomery, is featured in a portion of the exhibit that is focused on state building codes.

Park Crossing, which opened last fall, incorporated seven safe rooms into its multi-building, 165,390-square foot campus, with the areas of refuge integrated into classrooms and music/band rehearsal spaces. Instead of building one large safe room, multiple safe rooms were distributed throughout the school so students and staff would have a shelter in close proximity.

Read more about the Park Crossing HS safe rooms and view a photo gallery of the school at bit.ly/1rWhOWa

Interior insights

Visit ASUmag.com to view exclusive galleries exploring award-winning school design projects featured in the AS&U Educational Interiors Showcase.



Touting technical literacy



Robert Johnson

With technology burgeoning at schools today and more coming tomorrow, technical literacy is a critical skill. Most of us think of technical literacy as related to students. Personally, I'm not too worried about their technical literacy. I'm much more worried about trustees, cabinet members, staff and faculty.

The full text of this blog post by Robert Johnson of Atrion Networking Corporation, as well as other online exclusive technology commentary, can be found at <http://asumag.com/blog/tech-talk>.

Vote in our recent poll, "How important are the green/sustainable attributes of the products you will use in your next construction project?" at <http://asumag.com/poll/08192014>.

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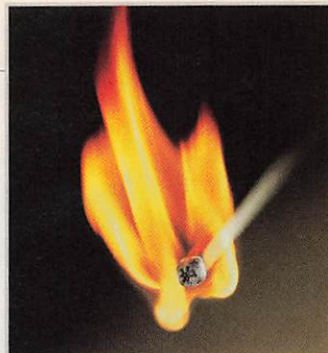
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INSIDE TECHNOLOGY



Sylvia Martinez and Dr. Gary Stager, co-authors of *Invent to Learn: Making, Tinkering, and Engineering in the Classroom*.

NEW YORK STATE OF THE ART

New York Gov. Andrew Cuomo's plan to spend \$2 billion on school technology appears to be gaining traction, the *Journal News* reported.

The proposal, which will be on the Nov. 4 ballot, would rely on bond money to upgrade technology throughout the state. If approved, districts could use the funds on equipment, security features, pre-k modernization and infrastructure upgrades that improve broadband and Wi-Fi, according to the *Journal News*.

Some, however, have voiced concern over borrowing funds for such a short-term purpose, and others have questioned whether the debt service payments would siphon funding away from other critical needs.

"Everything in the state budget competes against everything else," Robert Lowry, deputy director of the New York State Council of School Superintendents, told the *Journal News*. "Many districts face basic financial challenges, and this cannot distract from addressing those needs."

But without the state aid, it's unlikely many districts would be able to pay for the technology upgrades, others noted.

"In a perfect world, we probably shouldn't be bonding computer tablets," New York State School Boards Association spokesman David Albert told the *Journal News*. "But if I have a choice between not having the money or funding it through this mechanism, it's more important to have it."

MAKING DO

The "maker" culture that spun off from the do-it-yourself movement nearly a decade ago is now starting to make its way into schools.

Schools with varying levels of resources are adopting the concept – a Maker's Space is, after all, about creation and innovation – but a few big-ticket items, like 3D printers, production equipment and laser cutters, have become popular additions where feasible. That has, in turn, led some schools to designate specific areas as a Maker's Space that can be easily secured and monitored.

But two experts say to be wary of relegating the concept to one space in the building. Sylvia Martinez and Dr. Gary Stager, co-authors of *Invent to Learn: Making, Tinkering, and Engineering in the Classroom*, say what they are seeing with Maker's Spaces now is reminiscent of the early move toward computer labs.

Martinez and Stager recently attended the International Society for Technology in Education conference in Atlanta, where the maker movement's growing influence was visible. The two met at the ISTE conference 22 years ago.

"The history of computers went from 1-to-1 to labs," Martinez, a former aerospace engineer, said in an interview with AS&U.

"The computer lab became a place that you visited as a separate part of your class. That gave permission for class to not change. What we're trying to advocate for is that we don't repeat that historical mistake. We don't want the Maker's Space to be where you learn this thing called Maker's Space and then science class doesn't change and math class doesn't change."

The two say the maker movement, which is heavily influenced by French theorist Jean Piaget's research that children learn by doing, isn't so much

a class that can be added to a student's schedule. It's a different way of looking at student development and education.

"Philosophically, school is really good at nouns," said Stager, founder of the Constructing Modern Knowledge institute. "We ought to be focusing more on verbs. For some reason, we're talking about putting Maker's Spaces places as opposed to putting (in) making places.

"I like to say that the greatest Maker's Space is in between your ears," he also said. "It's a stance. It's a way of recognizing that I have the confidence and competence to solve any problem I confront, even if only to discover that I need to learn a lot more."

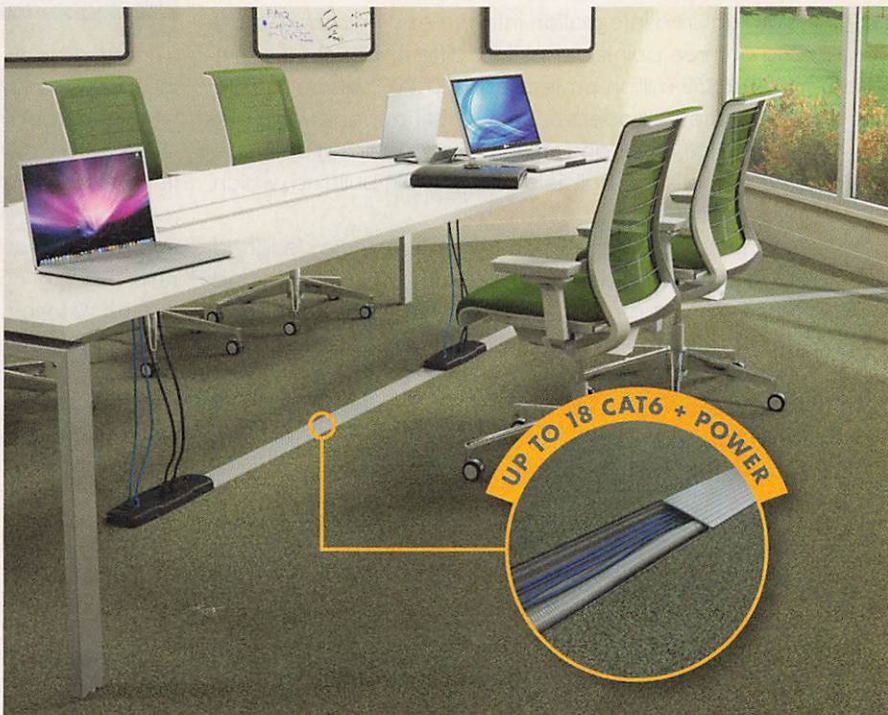
That said, both of them agreed that the physical environment of a school matters when adopting the maker approach. They just don't want to see a Maker's Space materialize as a bunker down the hall.

Students should have flexible workspaces and room to spread out, with natural lighting and ample access to electrical outlets. Ventilation becomes important. Students also need spaces where they can be noisy without adversely affecting those who need to work in quiet. Classrooms need more storage – and storage with lids to protect ongoing projects. And after all that time and effort, the

students will need display spaces to share their work and so others can learn from it.

"People are really, really inventive if you give them a little space and cool materials to work with," Martinez said. "A lot of people are talking about how

we need to add 'aesthetics' and 'art education' and it should be STEAM, not STEM. But if kids have great materials and time and they care about what they're working on, they will automatically add their own aesthetic to their projects." ■



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MUSIC/PERFORMING ARTS FACILITIES CONSTRUCTION ZONE

PROGRESSIVE PERFORMANCE CENTER

SHP Leading Design recently completed a new performing arts facility at Walnut Hills High School in Cincinnati. The firm, which has offices in both Cincinnati and Columbus, faced a number of challenges in completing the project.

Among the design challenges was that the expansion required integration into the existing school building at three points across four different levels.

The \$52 million project adds 77,000 square feet to the campus, modernizing the existing space while preserving its history, and fitting the new building between the school's football field and its main building, which was built in 1929.

The new performance music spaces were designed to rival college facilities with dimensions, finishes and acoustical treatments designed specifically for each specialized music genre, including orchestra, vocal and band, according to the firm.

Another unique feature of the space is a six-lane, 750,000-gallon competitive swimming pool. Water from



Before



The Walnut Hills auditorium before and after renovation. Photo courtesy of SHP Leading Design.

the pool is used to heat and cool the LEED Gold certified building. The renovated auditorium incorporates new LED lighting, sprinklers and finishes while respecting the historic nature of the space.

The project required two demolitions, three swing space changes of use and nine overlapping construction phases over four years in order to keep the campus functioning throughout the renovation. ■



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THE AS&U 100

Schools in some former metropolises have faded remarkably in the last quarter century, while other districts flourish in unlikely places.

BY JILL NOLIN

Urban school districts continue efforts to stabilize student enrollment, as charter schools and suburban school districts increasingly serve as alluring alternatives to parents seeking the best education possible for their kids.

But no district has struggled with student loss more than Detroit, where enrollment has dropped precipitously over the years.

So dramatic is the change that it's hard to reconcile the enrollment figures: Just 25 years ago, Detroit was the seventh largest district in the country. For the 2012-2013 school year, it was the 91st largest – and that's after taking a tumble from the 55th spot the year prior.

District officials are trying to flip the script, though, and they're already showing some success. Tired of hemorrhaging students every year and losing the funding tied to each departing student, the district launched a student retention campaign.

With the help of marketing slogans, a door-to-door campaign involving prin-

cipals, teachers, parents and students, and other efforts to rebuild relationships between the individual schools and the community, the district was able to slow the exodus in the 2013-2014 school year to a 1.8 percent enrollment loss.

Meanwhile, the suburban areas that are welcoming these displaced urban students wrestle with the growing pains that come with enrollment bursts. The Gwinnett County, Ga., system, for example, has swelled nearly 200 percent over the last 25 years as students left Atlanta Public Schools (APS has seen about a 26 percent drop during that same time).

Other significant growth districts are Alpine, Utah; Charlotte-Mecklenburg, N.C.; Denver, Co.; Garden Grove Unified, Calif.; Jefferson County, Ky.; Katy, Texas; Loudoun County, Va.; Omaha, Neb.; and Pasco County, Fla. All of these districts experienced at least 3 percent growth from 2011-2012 to 2012-13.

Also, not all urban districts are fighting to retain and attract students. Jefferson County, Ky., which is home to

Louisville, was the biggest gainer among the largest 100 schools in 2012-2013. Meanwhile, Houston's student enrollment is holding steady even while neighboring Cypress-Fairbanks sees explosive growth, and Douglas County, Co., is thriving while its larger neighbor Denver is experiencing its own enrollment gains.

A NOTE ON METHODOLOGY

2012-13 enrollment data was sourced directly from school districts when possible, but in some cases uses city, county, and state education department figures when district figures were not made available. 2011-12 enrollment data is from last year's edition of the AS&U 100. Data regarding the 1987-88 school year also came from NCES. District population data is based on U.S. Census projections. Due to slight variations in methodology between this year's listing and last year's, some year-over-year data may be subject to interpretation.

Data in the higher education ranking is derived from NCES statistics.

RANK 2012- 2013	DISTRICT	STATE	ENROLLMENT 2012-13	DISTRICT POPULATION	% OF POPULA- TION ATTEND- ING PUBLIC SCHOOLS	ENROLLMENT 2011-12	1 YEAR % CHANGE	ENROLLMENT 1987-88	% CHANGE 25 YEARS	RANK 1987- 1988
1	NEW YORK CITY	NY	1,036,053	8,187,643	12.65%	1,041,437	-0.52%	939,933	10.23%	1
2	LOS ANGELES UNIFIED	CA	655,494	4,549,255	14.41%	662,140	-1.00%	589,311	11.23%	2
3	CHICAGO	IL	403,461	2,712,920	14.87%	409,530	-1.48%	419,537	-3.83%	3
4	MIAMI-DADE	FL	354,236	2,553,696	13.87%	350,227	1.14%	253,720	39.62%	4
5	CLARK COUNTY	NV	311,429	1,954,436	15.93%	308,447	0.97%	100,027	211.34%	18
6	BROWARD COUNTY	FL	260,234	1,755,201	14.83%	258,454	0.69%	137,366	89.45%	9
7	HOUSTON	TX	202,586	1,320,974	15.34%	201,594	0.49%	191,708	5.67%	6
8	HILLSBOROUGH COUNTY	FL	200,287	1,238,399	16.17%	197,001	1.67%	118,171	69.49%	11
9	HAWAII	HI	183,251	1,390,000	13.18%	181,213	1.12%	166,160	10.29%	8
10	ORANGE COUNTY	FL	183,021	1,149,748	15.92%	179,989	1.68%	88,878	105.92%	23

RANK 2012- 2013	DISTRICT	STATE	ENROLLMENT 2012-13	DISTRICT POPULATION	% OF POPULA- TION ATTEND- ING PUBLIC SCHOOLS	ENROLLMENT 2011-12	1 YEAR % CHANGE	ENROLLMENT 1987-88	% CHANGE 25 YEARS	RANK 1987- 1988
11	FAIRFAX COUNTY	VA	181,536	1,083,770	16.75%	177,606	2.21%	112,599	61.22%	13
12	PALM BEACH COUNTY	FL	179,494	1,321,827	13.58%	176,901	1.47%	89,944	99.56%	22
13	GWINNETT COUNTY	GA	163,062	798,489	20.42%	162,370	0.43%	54,754	197.81%	53
14	DALLAS	TX	158,680	1,241,700	12.78%	157,085	1.02%	130,885	21.24%	10
15	WAKE COUNTY	NC	149,508	906,731	16.49%	146,687	1.92%	59,687	150.49%	46
16	MONTGOMERY COUNTY	MD	148,779	1,004,709	14.81%	146,459	1.58%	96,271	54.54%	19
17	PHILADELPHIA	PA	143,898	1,526,413	9.43%	154,262	-6.72%	194,698	-26.09%	5
18	CHARLOTTE-MECKLEN- BURG	NC	142,612	925,406	15.41%	137,913	3.41%	74,680	90.96%	28
19	SAN DIEGO UNIFIED	CA	130,270	1,018,633	12.79%	131,016	-0.57%	116,557	11.77%	12
20	DUVAL COUNTY	FL	125,662	865,308	14.52%	125,464	0.16%	105,049	19.62%	16
21	PRINCE GEORGE'S COUNTY	MD	123,737	881,138	14.04%	123,833	-0.08%	104,412	18.51%	17
22	CYPRESS-FAIRBANKS	TX	109,733	587,142	18.69%	107,660	1.93%	34,073	222.05%	84
23	MEMPHIS	TN	108,846	654,556	16.63%	109,362	-0.47%	107,345	1.40%	15
24	COBB COUNTY	GA	108,262	707,442	15.30%	107,291	0.91%	64,172	68.71%	38
25	BALTIMORE COUNTY	MD	107,033	817,455	13.09%	105,153	1.79%	81,152	31.89%	26
26	PINELLAS COUNTY	FL	103,596	916,316	11.31%	103,705	-0.11%	88,866	16.58%	24
27	JEFFERSON COUNTY	KY	100,420	750,828	13.37%	94,921	5.79%	93,198	7.75%	20
28	NORTHSIDE	TX	99,426	575,000	17.29%	97,204	2.29%	46,822	112.35%	59
29	DEKALB COUNTY	GA	98,298	707,089	13.90%	98,088	0.21%	73,865	33.08%	29
30	POLK COUNTY	FL	96,943	603,700	16.06%	96,034	0.95%	61,391	57.91%	44
31	ALBUQUERQUE	NM	94,083	555,419	16.94%	94,318	-0.25%	82,416	14.16%	25
32	FULTON COUNTY	GA	93,837	531,485	17.66%	92,604	1.33%	40,154	133.69%	70
33	AUSTIN	TX	86,233	642,291	13.43%	86,124	0.13%	61,402	40.44%	43
34	LEE COUNTY	FL	85,333	621,359	13.73%	83,896	1.71%	37,708	126.30%	74
35	BALTIMORE CITY	MD	84,747	621,342	13.64%	84,212	0.64%	110,189	-23.09%	14
36	DENVER	CO	84,424	634,265	13.31%	80,890	4.37%	59,439	42.03%	48
37	JEFFERSON COUNTY	CO	84,150	545,358	15.43%	85,751	-1.87%	75,337	11.70%	27
38	PRINCE WILLIAM COUNTY	VA	83,551	396,919	21.05%	81,937	1.97%	34,960	138.99%	81
39	FORT WORTH	TX	82,852	469,038	17.66%	82,853	-0.00%	67,191	23.31%	33
40	NASHVILLE-DAVIDSON CO	TN	81,033	628,179	12.90%	78,975	2.61%	67,538	19.98%	32
41	LONG BEACH UNIFIED	CA	80,420	513,940	15.65%	83,691	-3.91%	66,253	21.38%	34
42	ANNE ARUNDEL COUNTY	MD	78,490	550,488	14.26%	76,303	2.87%	64,432	21.82%	37
43	MILWAUKEE	WI	78,461	595,110	13.18%	79,130	-0.85%	91,648	-14.39%	21
44	FRESNO UNIFIED	CA	74,235	383,607	19.35%	74,235	0.00%	61,539	20.63%	41
45	GUILFORD COUNTY	NC	72,585	489,710	14.82%	71,995	0.82%	23,984	202.64%	92
46	GREENVILLE	SC	71,249	469,054	15.19%	72,156	-1.26%	50,886	40.02%	55
47	BREVARD COUNTY	FL	71,217	543,168	13.11%	71,786	-0.79%	49,510	43.84%	58
48	ALPINE	UT	70,863	285,146	24.85%	68,233	3.85%	36,005	96.81%	78
49	FORT BEND	TX	69,123	350,334	19.73%	68,964	0.23%	28,738	140.53%	87
50	PASCO COUNTY	FL	68,904	464,867	14.82%	66,657	3.37%	30,305	127.37%	86
51	VIRGINIA BEACH	VA	68,408	438,944	15.58%	70,978	-3.62%	58,763	16.41%	50
52	DAVIS	UT	68,342	307,194	22.25%	67,736	0.89%	49,684	37.55%	57
53	LOUDOUN COUNTY	VA	68,205	314,790	21.67%	65,585	3.99%	12,011	467.85%	102
54	NORTH EAST	TX	67,701	396,559	17.07%	67,208	0.73%	38,688	74.99%	71
55	GRANITE	UT	67,600	384,258	17.59%	67,736	-0.20%	73,312	-7.79%	30
56	DOUGLAS COUNTY	CO	65,699	298,215	22.03%	63,114	4.10%	10,501	525.65%	103

CONTINUED...

RANK 2012- 2013	DISTRICT	STATE	ENROLLMENT 2012-13	DISTRICT POPULATION	% OF POPULA- TION ATTEND- ING PUBLIC SCHOOLS	ENROLLMENT 2011-12	1 YEAR % CHANGE	ENROLLMENT 1987-88	% CHANGE 25 YEARS	RANK 1987- 1988
57	ALDINE	TX	65,320	269,526	24.24%	64,037	2.00%	37,657	73.46%	75
58	ARLINGTON	TX	64,913	375,598	17.28%	64,592	0.50%	41,414	56.74%	68
59	MESA	AZ	64,892	463,781	13.99%	65,662	-1.17%	59,367	9.31%	49
60	KATY	TX	64,562	256,767	25.14%	62,153	3.88%	15,952	304.73%	100
61	SEMINOLE COUNTY	FL	64,368	422,690	15.23%	64,335	0.05%	43,511	47.94%	65
62	EL PASO	TX	62,884	324,544	19.38%	63,794	-1.43%	61,800	1.75%	40
63	WASHOE COUNTY	NV	62,424	421,920	14.80%	65,368	-4.50%	34,538	80.74%	83
64	ELK GROVE UNIFIED	CA	61,237	320,068	19.13%	62,123	-1.43%	19,904	207.66%	97
65	VOLUSIA COUNTY	FL	61,124	494,715	12.36%	61,524	-0.65%	41,829	46.13%	66
66	CHESTERFIELD COUNTY	VA	59,863	194,899	30.71%	59,200	1.12%	36,056	66.03%	77
67	GARLAND	TX	59,186	278,382	21.26%	57,954	2.13%	34,603	71.04%	82
68	MOBILE COUNTY	AL	58,111	399,178	14.56%	59,971	-3.10%	67,619	-14.06%	31
69	KNOX COUNTY	TN	58,000	433,171	13.39%	57,505	0.86%	50,533	14.78%	56
70	SANTA ANA UNIFIED	CA	57,326	444,622	12.89%	57,250	0.13%	38,184	50.13%	73
71	SAN FRANCISCO UNIFIED	CA	57,000	334,227	17.05%	56,222	1.38%	63,881	-10.77%	39
72	PLANO	TX	56,310	328,600	17.14%	55,386	1.67%	28,231	99.46%	89
73	BOSTON	MA	54,839	259,841	21.10%	55,027	-0.34%	59,445	-7.75%	47
74	OSCEOLA COUNTY	FL	54,300	270,391	20.08%	54,776	-0.87%	14,448	275.83%	101
75	CORONA-NORCO UNIFIED	CA	53,917	261,085	20.65%	53,467	0.84%	18,296	194.69%	98
76	PASADENA	TX	53,833	248,720	21.64%	52,708	2.13%	22,064	143.99%	94
77	SAN ANTONIO	TX	53,800	306,296	17.56%	54,260	-0.85%	61,501	-12.52%	42
78	CAPISTRANO UNIFIED	CA	53,785	341,254	15.76%	53,170	1.16%	21,920	145.37%	95
79	SAN BERNARDINO CITY UNIFIED	CA	53,782	253,447	21.22%	53,378	0.76%	35,033	53.52%	80
80	TUCSON	AZ	53,632	480,141	11.17%	52,191	2.76%	55,175	-2.80%	52
81	FORSYTH COUNTY	NC	53,449	351,622	15.20%	52,612	1.59%	38,588	38.51%	72
82	HOWARD COUNTY	MD	53,035	325,871	16.27%	51,555	2.87%	26,653	98.98%	91
83	CHERRY CREEK	CO	52,795	361,220	14.62%	52,589	0.39%	26,739	97.45%	90
84	LEWISVILLE	TX	52,520	271,771	19.33%	51,779	1.43%	17,712	196.52%	99
85	CUMBERLAND COUNTY	NC	52,399	296,581	17.67%	51,750	1.25%	44,216	18.51%	63
86	OMAHA	NE	51,990	169,443	30.68%	50,372	3.21%	41,416	25.53%	67
87	CONROE	TX	51,786	263,077	19.68%	52,357	-1.09%	21,155	144.79%	96
88	JORDAN	UT	51,281	822,553	6.23%	50,581	1.38%	61,230	-16.25%	45
89	CLAYTON COUNTY	GA	50,641	304,580	16.63%	51,108	-0.91%	33,893	49.41%	85
90	COLUMBUS	OH	50,204	264,220	19.00%	50,630	-0.84%	65,562	-23.43%	35
91	DETROIT	MI	49,854	716,568	6.96%	66,132	-24.61%	181,583	-72.54%	7
92	GARDEN GROVE UNIFIED	CA	49,592	276,278	17.95%	47,999	3.32%	36,289	36.66%	76
93	BROWNSVILLE	TX	49,407	186,960	26.43%	49,593	-0.38%	35,255	40.14%	79
94	SEATTLE	WA	49,129	181,860	27.01%	49,266	-0.28%	43,850	12.04%	64
95	WICHITA	KS	48,909	447,841	10.92%	49,888	-1.96%	45,689	7.05%	62
96	ATLANTA	GA	48,692	434,353	11.21%	50,009	-2.63%	65,417	-25.57%	36
97	HENRICO COUNTY	VA	48,324	386,552	12.50%	49,654	-2.68%	28,309	70.70%	88
98	SAN JUAN UNIFIED	CA	47,890	318,081	15.06%	47,245	1.37%	46,710	2.53%	60
99	SACRAMENTO CITY UNIFIED	CA	46,936	318,536	14.73%	47,939	-2.09%	46,064	1.89%	61
100	ANCHORAGE	AK	46,522	652,405	7.13%	48,816	-4.70%	40,941	13.63%	69



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HIGHER-EDUCATION INSTITUTIONS WITH HIGHEST ENROLLMENT, FALL 2013

RANK	INSTITUTION	TYPE	LOCATION	STATE	TOTAL ENROLLMENT, FALL 2013	TOTAL ENROLLMENT, FALL 2011	% CHANGE
1	UNIVERSITY OF PHOENIX	PRIVATE	PHOENIX	AZ	442,033	307,871	43.58%
2	IVY TECH COMMUNITY COLLEGE	PUBLIC	INDIANAPOLIS	IN	175,313	111,775	56.84%
3	ASHFORD UNIVERSITY	PRIVATE	CLINTON	IA	169,843	74,596	127.68%
4	AMERICAN PUBLIC UNIVERSITY SYSTEM	PRIVATE	CHARLES TOWN	WV	110,644	50,838	117.64%
5	MIAMI DADE COLLEGE	PUBLIC	MIAMI	FL	100,855	63,736	58.24%
6	LONE STAR COLLEGE SYSTEM	PUBLIC	THE WOODLANDS	TX	98,313	63,029	55.98%
7	LIBERTY UNIVERSITY	PRIVATE	LYNCHBURG	VA	95,639	64,096	49.21%
8	HOUSTON COMMUNITY COLLEGE	PUBLIC	HOUSTON	TX	93,625	63,015	48.58%
9	ARIZONA STATE UNIVERSITY	PUBLIC	TEMPE	AZ	81,789	72,254	13.20%
10	KAPLAN UNIVERSITY	PRIVATE	DAVENPORT	IA	77,566	56,606	37.03%
11	NORTHERN VIRGINIA COMMUNITY COLLEGE	PUBLIC	ANNANDALE	VA	76,552	50,044	52.97%
12	WALDEN UNIVERSITY	PRIVATE	MINNEAPOLIS	MN	75,895	48,982	54.94%
13	TARRANT COUNTY COLLEGE DISTRICT	PUBLIC	FORT WORTH	TX	75,547	50,062	50.91%
14	GRAND CANYON UNIVERSITY	PRIVATE	PHOENIX	AZ	71,712	40,487	77.12%
15	AUSTIN COMMUNITY COLLEGE DISTRICT	PUBLIC	AUSTIN	TX	70,452	45,100	56.21%
16	UNIVERSITY OF CENTRAL FLORIDA	PUBLIC	ORLANDO	FL	69,086	58,465	18.17%
17	OHIO STATE UNIVERSITY	PUBLIC	COLUMBUS	OH	64,930	56,867	14.18%
18	UNIVERSITY OF MARYLAND	PUBLIC	ADELPHI	MD	64,737	42,713	51.56%
19	UNIVERSITY OF MINNESOTA	PUBLIC	MINNEAPOLIS	MN	63,929	52,557	21.64%
20	BROWARD COLLEGE	PUBLIC	FORT LAUDERDALE	FL	62,796	42,198	48.81%

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Age of Enlightenment

Does dynamic daylight necessitate a new definition for the well-lit environment?

BY ROBERT J. BOLIN, PE, AND KRISTOPHER S. BAKER, PE



Schools in the early 20th Century, like this one in Portland, Ore., featured large windows to capitalize on daylight — the only light available at the time. But daylighting is making a comeback. Photo courtesy of Syska Hennessy Group.

For decades, schools of all shapes and sizes – whether primary, secondary or higher education – have led the industry in designing daylight into their projects. In parallel, industry and academia have taught designers and builders techniques, technologies, and testing necessary to provide the appropriate quantity and quality of light for the built environment.

However, there remains one caveat to the relative success of incorporating daylight in schools: the unchanging expectations of owners, designers, operators and occupants. Most designers and owners set project targets based around the same static

illumination requirements dictated by electric lighting design. All too frequently daylighting is simply seen as an alternative to electric lighting for supplying a constant level of lumens to a space, rather than as an opportunity to create a more dynamic environment based on light levels that transition throughout the day. All lumens are not created equally.

A BRIEF HISTORY OF LIGHT

The architecture of early 20th Century schools typically featured classrooms with large windows that allowed daylight to flood into the space. This was necessary since, at that time, daylight was the primary source

of lighting. This period of school architecture focused on double loaded corridors that maximized access to daylight in perimeter rooms while using transom windows to provide modest illumination to the central corridors. It was not until the advent of affordable electric fluorescent lighting during the mid 20th Century that daylighting became superfluous.

With the oil embargos of the 1960s and '70s and the subsequent energy crisis, school architecture evolved again. Natural light became an unsupportable luxury due to costs associated with heating and cooling those rooms. Many classroom buildings began to move corridors to the perimeter leav-

Color Temperature Chart

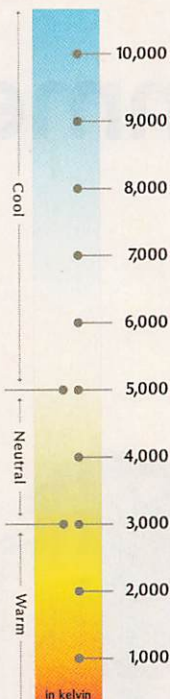
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4,000°K	• Standard Clear Metal Halide	
3,200-3,500°K	• Quartz Lights	• Warm Metal Halide
3,000°K	• Halogen Light	
2,500-2,900°K	• Household Tungsten	• Standard Incandescent
2,200°K	• High Pressure Sodium	
1,850-1,930°K	• Candle Light	
1,700-1,800°K	• Match Flame	

OUTDOOR Shade and Sun

10,000°K +	• Blue Sky	• Skylight
7,500°K	• Shade from blue Sky	
7,000-8,000°K	• Shade on clear Day	
6,000-7,000°K	• Cloudy Sky	
	• Shade from Clouds	
	• Shade in Daylight	
5,300-5,500°K	• Average Noon (Northern Hemisphere)	
5,000°K	• Late Morning	• Early Afternoon
4,500°K	• Mid Morning	• Mid Afternoon
4,000°K	• Late Afternoon	
3,500°K	• Early Morning	• Evening
2,000-3,000°K	• Sunrise	• Sunset



7,000°K Shade	5,200°K Daylight	3,000-7,000°K Auto Setting
6,000°K Flash Use	4,000°K White Fluorescent Light	2,500-10,000°K Color Temperature
6,000°K Cloudy, Twilight, Sunset	3,200°K Tungsten Light	2,000-10,000°K Custom Setting

ing windowless classrooms on the interior. Offices and student centers dramatically minimized the number and size of windows.

A fundamental switch in occupant expectations occurred along with this change in design philosophy. Buildings now had the ability to provide constant, unchanging light levels and unvarying, continuous luminance patterns. This static, benign environment was commonly considered beneficial – a distraction-free environment for learning. Couple this with the increasing introduction of electronic technology, and the result was an architectural ecosystem that was purposefully and desirably conceived as an unnatural environment.

FLIPPING THE SWITCH

The pendulum has thankfully swung back. There is an increasingly strong push to actively introduce natural light into new construction, especially within school facilities. Though it is often introduced based on the quantitative potential for reducing

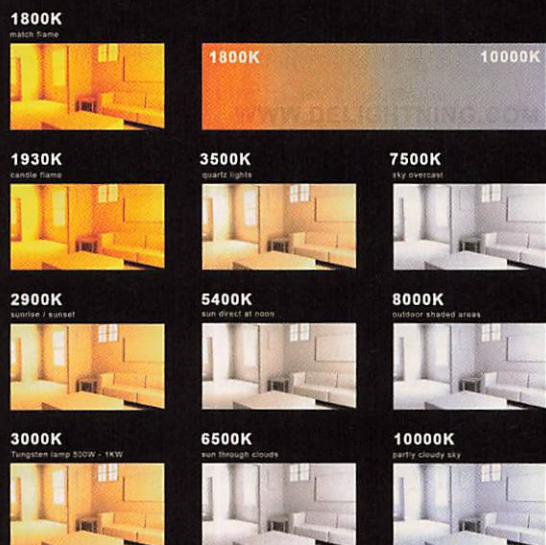
lighting energy, it's the qualitative improvements to the built environment that are orders of magnitude more valuable. By improving design elements directly related to how occupants engage the space, "the connection to the outdoors" is leveraged to realize a higher performance for all facilities. The industry report "Economics of Biophilia" produced by Terrapin Bright Green, provides a summary of the current research that shows daylighting to conclusively improve learning rates, increase worker satisfaction, increase retail sales, and reduce healing times, amongst other benefits. It is these non-energy benefits that are at risk when the common expectations for a benign environment are applied to a daylit space.

To understand this physiological relationship, we must first understand the inherently dynamic character of natural light. The daily illuminance intensity ranges from 0.01 footcandles (fc) for moonlight to 10,000 fc for noontime sun – a range of 1 to 1 million. Daily, color temperatures vary dramatically from roughly 1800K (orange) during sunrise and sunset to 5500K for direct sun (light blue). When the clouds roll in, the color temperature increases to at least 6500K (blue), while nighttime moonlight provides a color temperature around 4000K (white). It is this dynamic essence of natural light that impacts circadian rhythms; the color, intensity, and timing of light are the driving forces that balance hormonal levels within the body.

Admittedly, the industry has yet to fully understand the physiology behind why daylighting, or more accurately, why the hormonal balance provided by daylight offers such a varied and expansive set of benefits. The fear is that if the design and operational expectations of the space remain static, the full benefits of daylighting won't be realized. In essence, a project could follow all the best design principals set forth in guides such as The Lighting Research Center's "Patterns to Daylight Schools for People and Sustainability," but operator and occupant behavior could inadvertently compromise the value inherent to the daylight design.

Successfully designing with daylight requires a strategy of "educate, design, and educate." In the beginning, designers and owners need to recognize what a daylit space involves, how the space will operate, and how to maximize benefits. The design then follows, directed by a thorough understanding of the diversity and unique requirements of space types and occupancies. Upon completion, the design intent must then be communicated to the operators and occupants, otherwise the dynamic expectations and adjusted operation may be deemed as a failure.

COLOR TEMPERATURE CHART



THE SPACE AND THE OCCUPANT

A daylight design that embraces its dynamic nature begins with a consideration of the space and its occupants. Just as providing static light is not appropriate for all spaces and occupants, the level of variability must be gauged based on the individual needs of spaces. Simply put, we need to put the right type of daylight in the right type of space for the right reason. Based on the appropriate intensity, variability, and types of daylight, spaces should be assigned to one of the following five classifications:

- **Sunlit** – Presence of direct beam solar radiation within the space. Typically student lounges, reading areas of libraries, lobbies, dining facilities, dormitories.
- **Dynamic Daylight** – Larger daily and seasonal variations in light levels, movement of light apparent. Typically office areas, libraries, high traffic areas, some classrooms and athletic facilities.
- **Subtle Daylight** – Minimal daily and seasonal variations in light levels, little movement of light. Typically wet and dry labs, exam rooms, galleries, classrooms.
- **Taste of Daylight** – Psychological impact of daylight, but not consistent enough for primary source of illumination. Typically computer labs, some athletic facilities.
- **No Daylight** – Spaces where daylight will negatively affect the primary purpose of the room. Typically theaters.

ELECTRIC LIGHTING CONTROLS

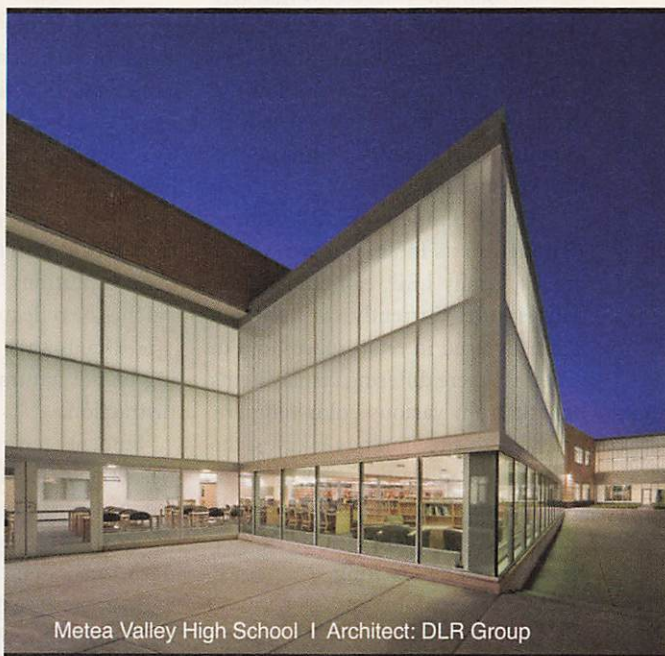
For a sunlit, dynamic or subtle daylight approach, the design must appropriately implement a lighting control scheme that minimizes the interference from supplemental electric lighting. The space should not feel as if it is primarily illuminated with electric lighting with highlights of daylight. Rather, the electric lighting should seamlessly augment the natural light.

- **Setpoint Range** – The most typical photocontrol scheme utilizes electric lighting to achieve the design electric light level when the daylight cannot achieve it on its own. In this scheme, the design electric light level is deemed as an absolute minimum so the only variability occurs when the space illuminance is higher than the design value. This control scheme dilutes the natural variations in light intensity and color, while nearly eliminating any noticeable time variation. An alternative approach allows a much fuller variability within the space. A broader deadband on the photocontrols would keep the electric lighting off until the light level drops below a setpoint of 50-60 percent of the design electric light level. Once energized, the electric lighting would then ramp up to meet the design electric light level. This approach greatly reduces the interference of the electric lighting during daily variations in daylight color and intensity. A hybrid approach would be required for spaces further into the core that may lack sufficient daylight.

- **Full Dimming Electric Lighting** – The most serious complaints in daylight-controlled spaces involve the use

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of stepped or on/off controls for the electric lighting. Sudden inexplicable changes in light level are artificial and disruptive. Full dimming capabilities with a slow response allow the dynamic light levels associated with moving cloud cover to communicate the exterior condition.

• Color Temperature Adjustment

Though in its infancy, electric lighting, especially LED, can adjust color temperature. Currently, this function is mostly used in retail spaces and in galleries where differing display items benefit from various color temperatures. As this technology evolves, the potential to adjust the color temperature within a space to further reduce the interference of the electric lighting in daylit space is exciting.

OCCUPANT AND OPERATOR EDUCATION

Finally, users must be educated to better understand the expectations for the space and how the daylight-

responsive design improves it.

- No longer should occupants expect (or want) an unchanging illumination level. This will often require occupants to actively adapt, such as using local task lighting.

- Unlike casinos, occupants should be provided with visual clues that denote the passage of time. This is typically provided in the form of transient glare conditions, such as direct solar patches or reflected sunlight.

- Occupants should stop thinking of the natural environment as a distraction.

Student recreational centers, cafeterias, athletic facilities, and libraries often incorporate aggressive daylighting designs and provide the highest quality daylit spaces on campus. These building types serve a more flexible or tolerant academic population. Functions within the buildings are considered less critical, and thus more conducive to a dynamic space. The key is to extend this flexibility and tolerance to class-

rooms, offices, laboratories, and other educational facilities.

Most educators know daylight is good, and many designers know how to design quality daylit spaces, but fewer occupants know how to engage a daylit space. But it is this dynamic nature of daylight that is embedded into the human psyche and physiology. As Le Corbusier once said, "Space and light and order. Those are the things that men need just as much as they need bread or a place to sleep." ■

BAKER, PE, LEED AP BD+C, ASHRAE HBDP, is a senior associate and **BOLIN, PE, LEED FELLOW, ASHRAE HBDP**, is a senior vice president with the New York-based engineering firm Syska Hennessy Group, Inc. WWW.SYSKA.COM

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Rethinking School Restroom Design

High-performance fixtures and design strategies encourage hygiene and safety, revitalize washroom spaces and increase operational efficiency.

BY WILL HAAS



Effectively designed school restrooms should be attractive environments that encourage a positive school image and hand washing, while discouraging vandalism and accidents. Photo courtesy of Bradley Corporation

Traditionally, school restrooms tend to get a bad rap. Our culture sometimes exaggerates the “ick factor” of public restrooms – a stigma these highly useful and necessary facilities must overcome. When school restrooms are not designed and maintained adequately, they can sometimes become havens for student misbehavior, vandalism attempts – and germs.

Poorly maintained restrooms also

discourage students from staying in the room long enough to follow through with proper hand washing, which is a must for preventing the spread of illness in close-contact school environments. According to the Centers for Disease Control and Prevention (CDC), good hand washing practices – scrubbing for at least 20 seconds – is the best antidote to germs. The CDC says nearly 22 million school days in the United States

are lost each year due to colds, and 38 million days are lost yearly to the influenza virus – both of which are transmitted through contact.

A 2013 national survey about public hand washing behavior conducted by the Bradley Corporation (see sidebar) reveals that a majority of respondents skipped hand washing because of various problems in the restroom. The most common complaints: a really bad smell (cited by 82 percent);



Newer lavatory fixtures are specifically designed to minimize water splashing on the floor, such as a completely touchless all-in-one hand washing unit that provides a sink, soap, faucet and hand dryer all in one station. Photo courtesy of Bradley Corporation

clogged/unflushed toilets (79 percent); and an overall appearance that's dirty, unkempt or old (73 percent).

And 70 percent of those surveyed admitted they have skipped using soap because no soap was available, the sink or soap dispenser was broken, or the restroom was too unclean.

Schools are not immune to these types of restroom problems. School restroom advocate Tom Keating, Ph.D., of Project CLEAN has estimated that one-third of more than 900,000 public school bathrooms in this country are dirty, unhealthy or unsafe.

The key task at hand for school administrators and facility managers is designing and maintaining attractive restroom environments that encourage a positive school image and hand washing, while discouraging vandalism and accidents. High-quality furnishings, such as lavatories, hand dryers, partitions, washroom accessories, lockers and showers – and a clean setting – can make a significant difference. New generation fixtures promote the principles of good restroom design – hygiene, safety, durability, sustainability, maintainability and operational efficiency.

THE ADVANTAGES OF TOUCH-FREE FIXTURES

In 2011, University of Colorado

researchers examined the microbial biogeography of public restroom surfaces and found that the hand washing process was responsible for significant bacterial exposure, as soap dispensers contained even more bacteria than toilet seats.

Using sensor-operated faucets, flush valves, soap dispensers and hand dryers can help minimize touchpoints on germ-ridden restroom surfaces and reduce cross-contamination from users' hands. Touchless fixtures improve hygiene in the restroom and the rest of the school, as users leave the restroom area and enter other parts of the building.

Touchless hand washing fixtures are also easier to keep in good working condition. "Hands-free" design helps reduce every day wear and tear, extra costs by controlling product usage with an automatic shut off, and vandalism attempts like leaving a faucet running or making a mess with soap or paper towels.

Similarly, wet floors are a major obstacle to school restroom cleanliness and safety, and require facility management's constant attention. Each year more than 234,000 people at least 15 years old end up in emergency rooms due to washroom injuries such as slips and falls, according to a 2008 CDC study. Some newer lavatory

ABOUT BRADLEY'S SURVEY

Bradley's Fifth Annual Healthy Hand Washing survey queried 1,015 American adults Aug. 1-5, 2013 about their hand washing habits in workplace and public restrooms. Participants were from around the country, ranged in age from 18 to 65 and older, and were fairly evenly split between men and women (47 and 53 percent). More results are available at <http://www.bradleycorp.com/handwashing>.

fixtures are specifically designed to minimize water splashing on the floor, such as a completely touchless all-in-one hand washing unit that provides a sink, soap, faucet and hand dryer all in one station. This eliminates the need for users to walk from the basin with dripping wet hands in search of a towel or hand dryer.

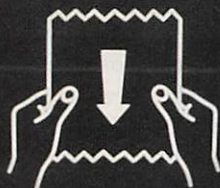
MINIMIZING PAPER AND WATER WASTE

Schools and universities use an abundance of paper and water, and paper towels account for thousands of dollars in expenses annually. Today's high-efficiency touchless hand dryers, which dry hands in 12 seconds or less, eliminate litter and vandalism attempts, and minimize staff time devoted to restocking and garbage pick-up.

As for water, commercial buildings consume 88 percent of America's potable water, and plumbing fixtures make up 47 percent of that figure, according to a 2008 study published in an industry publication. Analyzing plumbing fixtures' water consumption rates and looking for ways to lower the flow is a good idea from environmental and efficiency standpoints. While a water distribution audit can help with leak-detection prioritization, updating fixtures is another consideration. A

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WASHROOMS/LOCKER ROOMS



Using sensor-operated faucets, flush valves, soap dispensers and hand dryers can help minimize touchpoints on germ-ridden restroom surfaces and reduce cross-contamination from users' hands.. Photo courtesy of Bradley Corporation

standard low-flow faucet uses half a gallon of water per minute, and many educational facilities use outdated faucets that use much more. New technologies can reduce flow rates of faucets to .38 gallons per minute (GPM), which can deliver more than

24 percent in cost reductions compared to the previous generation of low-flow faucets.

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HAAS is product manager for Bradley Corporation, Menomonee Falls, Wis., a USGBC member and manufacturer of locker room products, plumbing fixtures, washroom accessories, partitions and emergency fixtures. WWW.BRADLEYCORP.COM.

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Strong Bones

Addressing the aging of critical infrastructure to insure against unexpected failure and natural disasters.

BY DAVID ISAACSON



Flooding and other natural disasters can exacerbate problems related to poorly maintained or aging school infrastructure. Photo courtesy of jayfish/iStock/thinkstock.com

The recent water main breakage in Los Angeles shines a spotlight on a problem that all too many K-12 schools, colleges, and universities face: the risk of critical but aging infrastructure failing suddenly. While not all failures are as spectacular as millions of gallons of water flooding streets and damaging UCLA campus

landmarks, the impact of key electrical, mechanical, plumbing, communication, or power plant failures can be far-reaching, even more so than the failure of individual buildings. And the impact of such failures goes far beyond the immediate disruption of normal operations. These failures expose schools to risks of increased in-

surance premiums, legal claims, fines, and expenses to make urgent repairs, harm to the institution's image, and "collateral damage" such as relocating people and finding alternate facilities to continue operations.

More schools are proactively addressing the issue of critical but aging infrastructure. Often led by both the

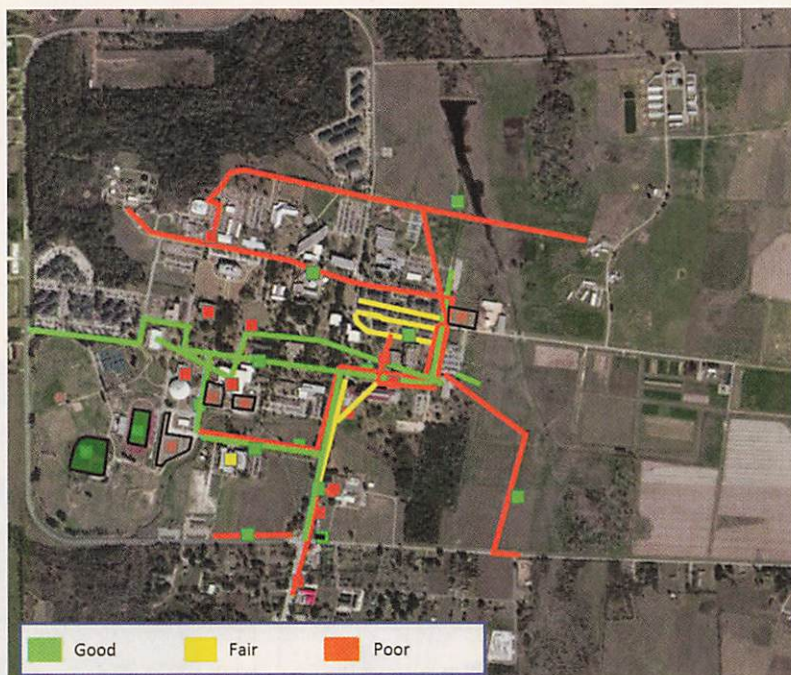


Figure 1: Mapping of linear infrastructure and the buildings they serve in a campus setting, with condition information. Photo courtesy of VFA

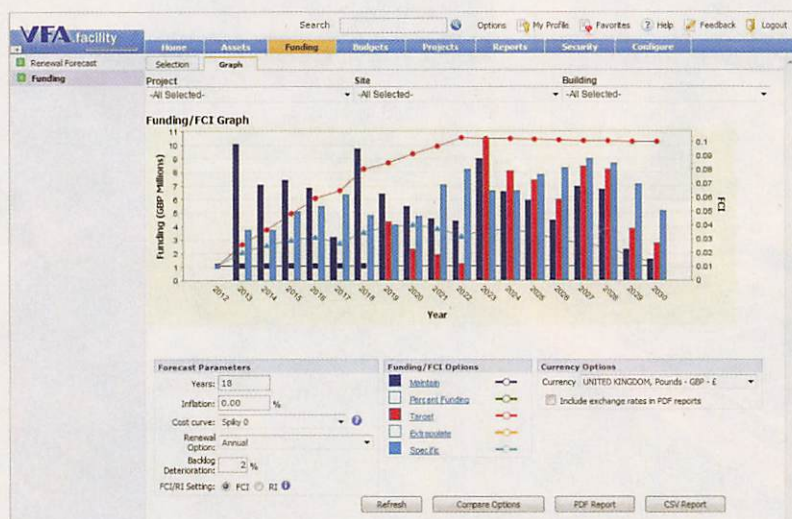


Figure 2: Various multi-year funding scenarios can be developed for different target levels of condition. Photo courtesy of VFA

Risk and Facilities Management departments, they have adopted a three-step process. The first step is to identify and quantify the areas of highest risk through on-site assessment by skilled specialists. The second step is to model different strategies for using limited capital resources to remediate the underlying issues, taking into account the tradeoffs this may require with existing and currently planned capital projects. The final step is to

begin implementing what will inevitably be a multi-year remediation effort, including gaining consensus from multiple constituencies, such as the local community, whose infrastructure may also pose risks.

STEP 1: VISIBILITY

Institutions are responsible for a broad range of physical assets, from buildings on and off campus, to the entire underground infrastructure

that supports the day-to-day operations. Managing all of these assets in a complex environment where there are multiple constituencies (students, faculty, administration, parents, and the community) can be a challenge, both operationally and politically, as each group has different goals and objectives. Knowing what is in the portfolio is not enough. Understanding the condition of each asset, its expected lifespan, the likelihood of failure, and the impact of such an outcome is needed in order to quantify the risks and set up an action plan. And since you can't always anticipate a major failure or a natural disaster, this understanding also serves as the foundation for rapidly recovering from a catastrophic event.

A best practice is to conduct a thorough review of the entire portfolio through a facility condition assessment (FCA) to understand the condition of each asset. Understanding the condition of every building is important but not enough. Infrastructure and site assets, such as underground water pipes, steam tunnels, and electrical service, are just as important. Schools can perform their own FCAs or hire a third-party firm to do this work. Either way, the resulting condition data should then be stored in a central database accessible by all relevant parties. Ideally, the data should be combined with a map showing both the facilities and linear assets (see Figure 1). Mapping the infrastructure along with any facilities served enables facilities teams to see the potential impacts of a failure.

FCAs capture the current condition of each system, along with the costs to remediate any issues and end-of-life renewals, which can then be rolled up to the condition of each asset or facility. From this data, it is possible to calculate the Facility Condition Index (FCI) and System Condition Index (SCI) which provides a relative measure of the condition of each system and asset. The FCI is derived by dividing all capital needs by the current replacement value of the as-

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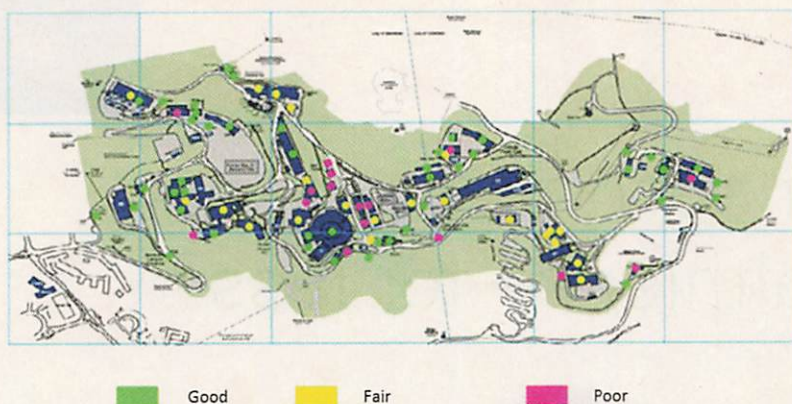


Figure 3: Combining Risk and Condition data highlights areas of highest need based on objective data.. Photo courtesy of VFA.

sets. The SCI is calculated by dividing the capital needs of each system by its current replacement value. These metrics enable sophisticated analysis for decision-making; for example, funding scenarios can show the impact on the FCI over time based on various funding levels (see Figure 2).

While the condition data from an FCA provides base information, adding a Risk Index helps pinpoint where to focus first. Combining system criticality with an FCI clarifies the financial and operational impacts of a potential failure. For example, classrooms in moderate condition are probably more important to address than a storage shed in poor condition. The Risk Index provides an objective view into the relative impact of projects across multiple areas of potential risk and helps build a solid case for the best use of existing funds and for securing additional funding for capital projects.

STEP 2: PRIORITIZATION

Schools taking a proactive approach have learned that identifying potential problems and the associated risks of failure is just the beginning. Prioritizing what to do and when to do it is the vital next step. The experiences of these schools indicates that a data-driven process which evaluates all competing uses of capital based on the institution's goals and explicitly prioritizes them is most effective in balancing competing constituencies in an environment of limited resources.

Creating and comparing multiple capital "strategies" supports this type of transparent, defensible approach and can often create consensus across different interest groups (see Figure 3).

The strategies defined for ranking capital needs, combined with analytics to understand current status and to adjust as conditions change, create a living capital plan, one that acts as an effective roadmap for addressing capital needs across the campus over time.

STEP 3: IMPLEMENTATION

As proactive institutions have found, the data collected to help mitigate the risk of significant failures can also help them be prepared to recover more quickly from disasters. Hurricane Sandy, which battered the east coast in 2012, illustrates this point. The New York City Health and Hospital Corporation (HHC), which runs numerous hospitals with more

than 18 million square feet of facilities, experienced tremendous damage during the storm. Prior to the hurricane, HHC had developed a complete capital planning and condition database of all their key assets. After the storm, HHC was able to quickly access that database, update the condition of each system, generate reports on their key systems, and identify what needed to be replaced or repaired. This enabled them to access FEMA and other insurance funds far sooner than they otherwise could have done and to be first in line to place replacement orders with manufacturers, shortening wait times.

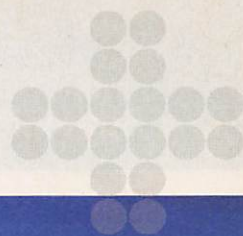
CONCLUSION

Schools can't predict disasters, but knowledge about aging buildings and infrastructure makes it possible to mitigate the impact. Best practices from leading institutions indicate that information about the entire portfolio, both building and linear assets, including data on the current conditions and risks, is a good starting point. Considering the needs of various constituencies, as well as the level of risk, in an objective prioritization process gives schools the ability to focus on what needs to be addressed first, and lets them recover more quickly in the event of a catastrophe. ■

ISAACSON is director of product marketing at VFA, Inc., a provider of end-to-end solutions for facilities capital planning and management. WWW.VFA.COM

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SMART SECURITY

Security design enhancements can help optimize school safety.

BY KENT HARRIS

Security design is prompted by life changing events, all out of personal control. National incidents, local events, and public demand are all factors in the decision making process toward enhancing security design. Deciding what to do, how to make effective changes, and keep those new factors functional are the larger issues. In regard to security design enhancements, there is no "one size fits all" solution to the design process. For example, building access is a paramount safety item, most generally addressed by architects and security design consultants during the design phase. And yet controlling building access should also be addressed with older existing buildings.

To ensure the success of proposed changes, entities should have the designs evaluated by an outside company that regularly examines plans for applicability to the building, code compliance and ease of public access. If access points are not user friendly, people will try to find a way around the controlled access. To illustrate this point think of how often you've seen a door that should shut and lock automatically that has been propped open. These kinds of shortcuts counteract all the hard work that goes into making the facility safer.

Many times administrators are thrust into a sense of emergency and order large scale, costly items in the name of safety and security. A prime example is the school district that installs campus camera systems. The district proudly announces that it now has a CCTV system for added security. Meanwhile, it has neglected to establish an actual monitoring station that would alert them in case of a security breach. Consequently, the new system has capability to record incidents but not prevent them, counter to the goal of security design, which is to get ahead of the events and defuse them as humanely as possible.

Protective systems should always be developed for specific assets. The goal of security design is to protect facilities, inhabitants, and the assets contained inside. The first step in the process is conducting a risk assessment to identify, document and address security issues.

Risk is defined as a variable that may have a potentially negative impact on a particular asset. It is characterized by four factors: threat, vulnerability, consequences, and probability (which

are not always known). The question should always be asked, "What are we protecting against?" The risk assessment takes all these factors into account and opens the conversation with the security design team.

Security design should also include review of current policies and training cycles. Systems function as intended when training is reinforced at regular intervals. What to do and when to do it becomes engrained and honed, much like muscle memory. Training develops confidence among staff and, with practice, assures operators the system and equipment work as designed.

As much as we want our schools and universities to be safe and inviting, enhancements must be made to maintain an appropriate level of security. The fine line between paranoia and prudent security is the responsibility of the security design consultant. Each location should be assessed from an environmental standpoint, including less obvious factors like:

- Historical events that might lead to future security issues.
- Specific security needs related to physical location.
- Internal, ongoing security measures training.

After evaluating all variables, a good security design team will work closely with the school or university to assist in the decision making process, making your facility safer both inside and out. ●

HARRIS is president of Harris Associated Consulting. He has extensive experience in security design and risk mitigation both domestically and internationally. He can be emailed at

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PICKING UP THE PIECES

Risk mitigation in the wake of disaster is a key security concern.

BY KENT HARRIS

The need for an emergency plan in today's unpredictable environment is self-evident. Some schools may already have such plans in place, which is commendable. However, one of the biggest concerns is the depth of the plan. Typical emergency plans take into account the period of the disaster and initial reaction to an event, but few have the layering needed to mitigate the disaster after the disaster.

This should be one of the key aspects of an emergency plan but most schools fail to anticipate the fallout that occurs in the wake of an emergency. Additionally, many emergency plans are simply copied from state agencies, and simply modified by entering the name of the school. Then the plan gets put on a shelf and business proceeds as usual.

The cookie cutter approach to emergency planning is fraught with pitfalls and fails to incorporate the layers of strategy needed for successful risk mitigation. For example, imagine a tornado event is occurring in your area. The emergency plan directs the students and staff to take shelter, which they do. Excellent. The tornado passes without injury or loss of life, and the emergency plan has performed well. However, in the wake of the initial event, post events begin to unfold. Frightened parents descend on the school seeking their children. Where are the students? Have they been moved to an alternate location due to damage to the school? Once an element of chaos is introduced, frightened parents quickly become angry parents. The access roads are now packed with parent vehicles and no one knows what to do or where to go. Parents unfamiliar with predetermined rendezvous points (assuming they have been set) rapidly move past anger and are now frantic. The administration and staff become the targets of this anger. It is an ugly situation that could have been mitigated by a layered plan.

Furthermore, once the dust has cleared, disgruntled parents may seek to strike back at the school/administration/district via litigation. The crux will be the weak emergency plan and administrators who developed it. And a plan written by a state agency and "adopted" by the district will not be given a pass.

A primary defense against this kind of lawsuit will be an emergency plan that is current, including regular updates by the security/emergency management team, and documented practice and testing. Additionally, the plan must include layering to ensure that all post disaster events are mitigated to the

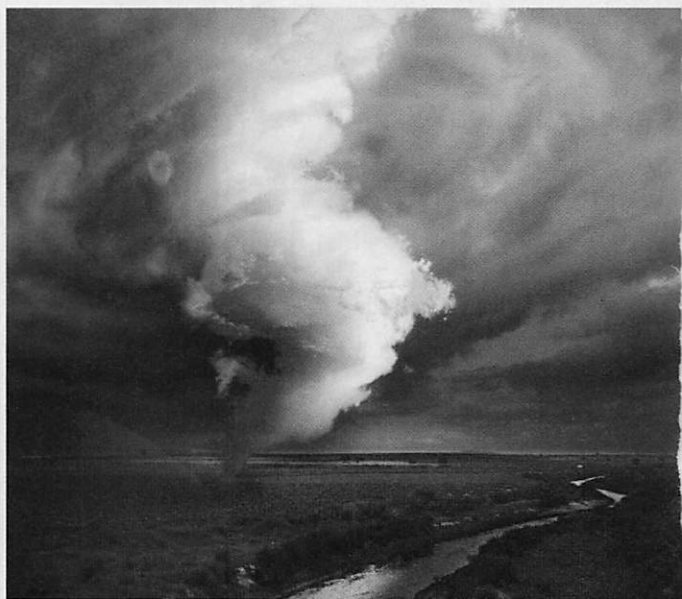


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best of everyone's ability. Lastly, the emergency plan should be communicated to all parents. Failure to do so only opens a school district to civil litigation.

There are many scenarios for the "disaster after the disaster." Layering an emergency plan and conveying information to parents, students, and local emergency response teams can mitigate most of these. Though we should not "what-if" ourselves to death, we can make reasonable assumptions about how people will react after an event and other factors that may occur.

An emergency plan is comprised of more than panic buttons, door hardware, and fencing of property. It's a serious discussion of what should be considered a priority after a risk assessment. Knowing in advance will assist in long range planning, leading to preparedness and progress. ●

HARRIS is president of Harris Associated Consulting. He has extensive experience in security design and risk mitigation both domestically and internationally. He can be emailed at KHARRIS@HARRISASSOCIATEDCONSULTING.COM



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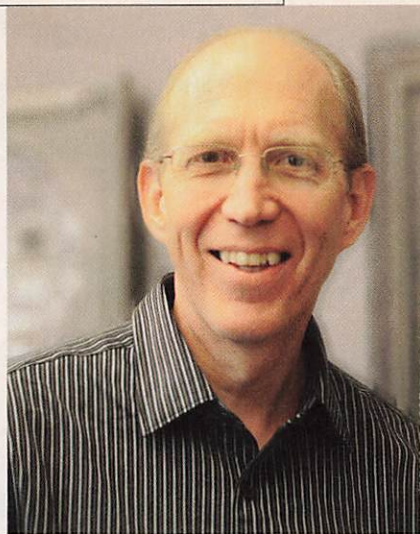


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A Bridge of Understanding

Part of innovative school design means learning which innovations the community wants and needs.



PAUL W. ERICKSON
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Architects designing schools today face a similar set of questions as those faced by technology innovators. Do we design and construct schools that people are familiar and comfortable with? Or do we design and construct truly innovative schools that can accommodate and support teaching/learning processes of the future; some of which have yet to be developed?

Since constructing a school requires the support of the community it serves, and such support is typically influenced by the teachers, parents, students, and staff who use the school, understanding the relationship between “what is” and the vision of “what can be” is required for all stakeholders. Four simple steps can construct a bridge of understanding that leads to broad support for innovative school design.

First, collaborate and build partnerships in every phase of project conception and design. Architects need to partner with engineers that have expertise in areas such as LEED design as well as with interior design specialists with expertise in areas such as ergonomics and coloration. In a similar manner, educational leaders must form partnerships with classroom teachers and specialists who recognize the relationship between space and learning and understand the role of technology in the teaching/learning process.

Another essential partnership is with the community. The community’s involvement in the “visioning” process is essential to gain their support. All of these partnerships must be built on trust and respect; recognizing differing perspectives helps ensure a successful project.

Second, communicate throughout the entire process. Collaboration is the art of people (often with differing opinions) coming together to share thoughts and ideas. The ability to communicate and share ideas – both visually and verbally – is of vital importance. Communicating in a variety of ways helps promote understanding and the creation of a shared vision.

Third, provide opportunities for all involved to see, feel, and touch innovation along the way. This step is especially important for teachers in the classroom who are focused on what they have and haven’t been exposed to the possibilities of what can be. Key community stakeholders need the same tactile experience, as they are likely to view school design through the lens of what their own experiences (four walls, desks in a room, teacher at the front, etc.). Virtual demonstrations or field trips that introduce new designs provide everyone with a sense that design innovation is good and that it’s working.

Finally, anticipate reticent partners along the way. Creating the buildings of tomorrow requires every-

one to leave their comfort zone. This is never easy because it’s not a natural part of human behavior. Therefore, throughout the process of designing for the future, expect that virtually everyone at one point or another will express concern for leaving the old and committing to the new. Exercise patience and confront these fears using steps 1, 2, and 3.

There is never a guarantee that, even when taking these steps, the outcome will be successful. Designing and constructing schools that accommodate the teaching/learning processes while instituting change is a formidable task. But, being aware of the importance of these steps, and implementing each, will better enable one to bridge the understanding.

This column is the first in a series of four columns covering this topic. The upcoming columns will explore these four steps, from an educator’s and architect’s perspective, in constructing a ‘bridge of understanding’ leading to broad support for innovative school design. ■

BIO

Paul W. Erickson, AIA/NCARB/REFP, is president of ATS&R Planners/Architects/Engineers, Minneapolis, a firm specializing in pre-K to 12 and post-secondary school planning and design.

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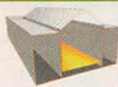
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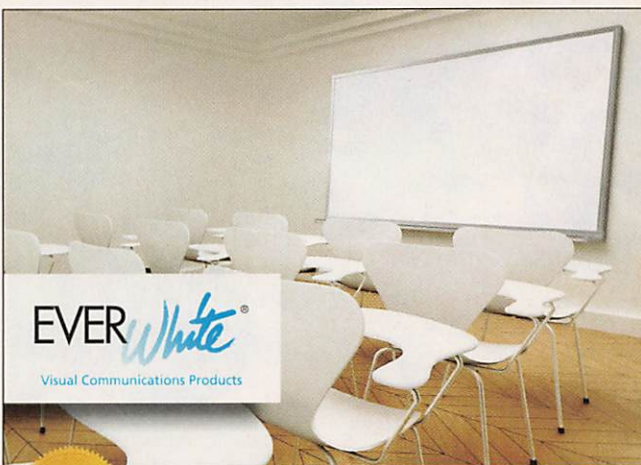
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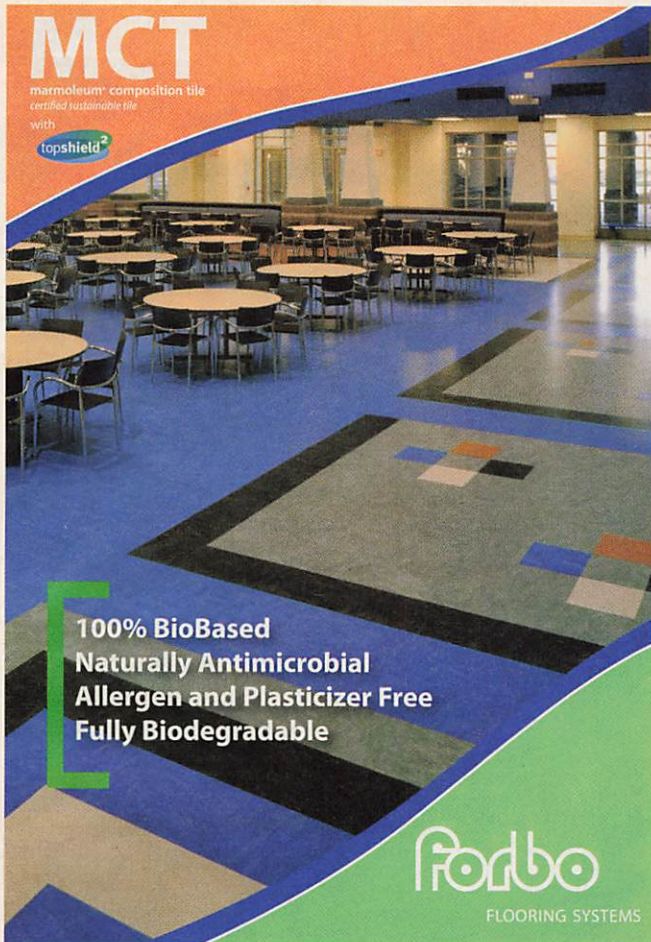
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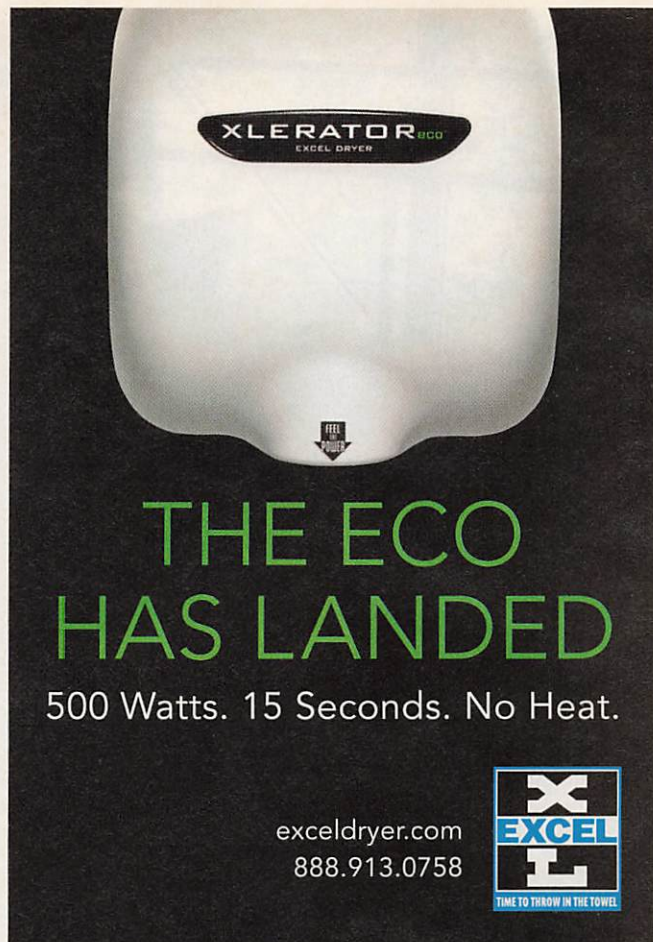
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**Bobrick's New Restroom Planning Guide
Covers the Latest ADA and ICC
Accessibility Standards.**

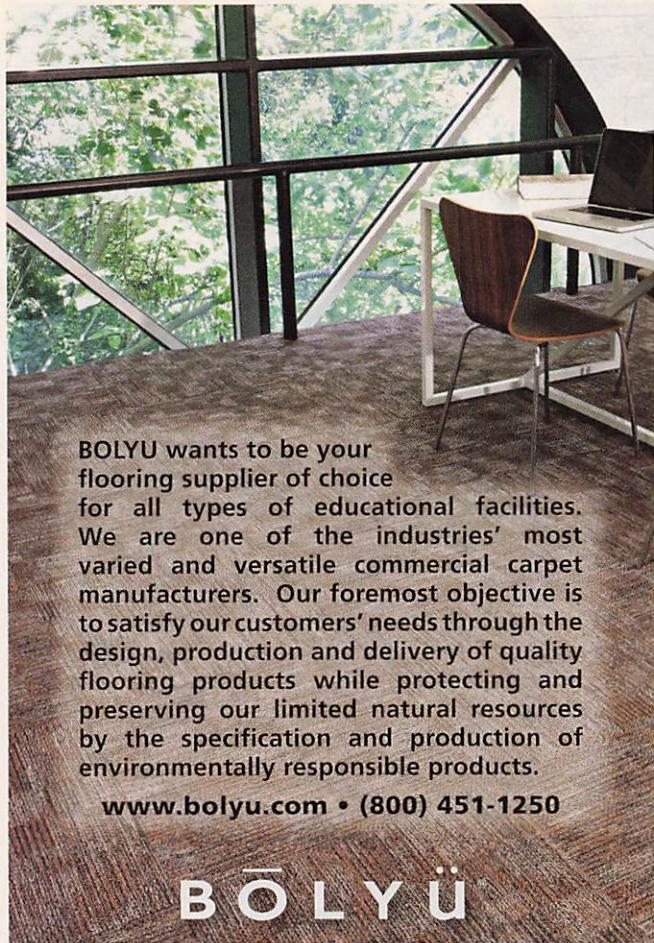


Bobrick Washroom Equipment has completed production of the Company's brand new "Planning Guide for Accessible Restrooms" referencing the 2010 American with Disabilities (ADA) Standards for Accessible Design and the ICC A117.1-2009 Standards for Accessible and Usable Buildings and Facilities. The new Guide presents the information in plain English and incorporates restroom floor plans and elevations along with blue notes for children's facility measurements. It is the most definitive resource document for designing compliant commercial restrooms for buildings of all types. Download from Bobrick.com, use the Literature Request Form or contact your Bobrick Representative.

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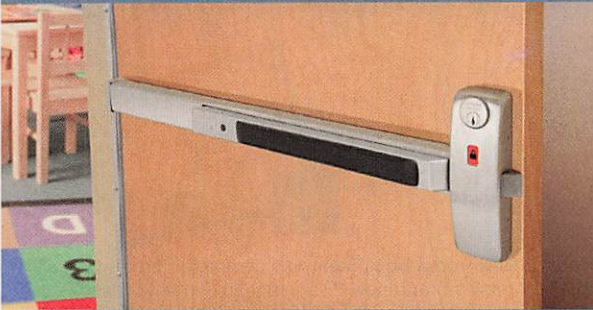


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PROFILES

PEOPLE, PLACES AND GOINGS-ON IN EDUCATION FACILITIES AND BUSINESS

TREE LUGGERS

The University of Michigan is moving a 350-ton burr oak to make room for a new building at the Ross School of Business. The relocation, which will cost \$400,000, has drawn criticism from within the school, according to Fox News.

Arborists will employ a newly patented technique called Arborlift to hoist the 44-foot-in-diameter rootball. The process uses oil well drilling equipment and air bladders to pull the tree from a hole that has already been dug around it. The tree will then be hauled one city block and replanted. The arborists estimate that the tree's chances of survival are 70-80 percent.

Some students are complaining that relocating the tree is a waste of money, particularly at a time when the university is increasing in-state tuition by 1.6 percent and out-of-state tuition by 3.4 percent.



Photo courtesy of yankane/iStock

NO REST FOR THE WEARY

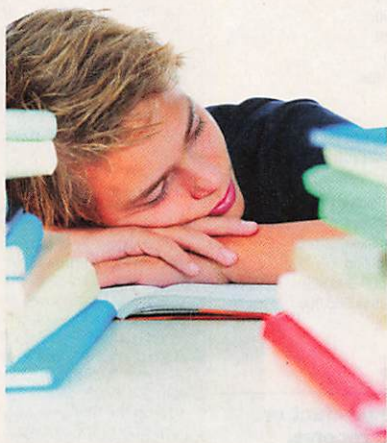


Photo courtesy of Yuri Arcurs/ Hemera

More high school students have to get up before the rooster crows, forcing them to get fueled up on coffee and energy drinks. But while biology may support later school start times for teenagers, economics demand that they remain early risers.

Staggered school start times reduce the number of buses that school districts must maintain. In Edwardsville, Mo., for instance, a staggered, three-tier schedule allows the same fleet of buses to be used more than once in the same morning. Adding the buses necessary to delay start times would

cost \$2.5 million, the St. Louis Post-Dispatch reported.

And while even Department of Education Secretary Arne Duncan tweeted last year to "let teens sleep, start school later," it seems likely that teens will have to wait until college to be able to sleep in.

THE OLD HOMESTEAD

A school district in Columbus, Ind., had to tap into its contingency fund after construction workers found an unexpected obstruction buried at the site of a performing arts expansion, WCSI news station reported. As the crew excavated for footers, they struck the remnants of a home that had been buried decades ago. Removing the home will cost the district an extra \$147,000. So far, all that has been uncovered are building materials and shoes.

TOWERING TRAGEDY

A Penn State University freshman died after either falling or jumping from an 85-foot-tall construction crane at the university's main campus, Reuters has reported. Jack Crean, an 18-year-old from Boalsburg, Pa., was found at about 11 a.m. on Aug. 24, just one day before classes started. The crane was at the Hetzel Union Building construction site, which is undergoing renovations. ■

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